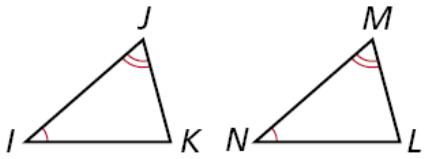
Geometry 4-4 Study Guide: Congruent Triangles (pp 239-245)

Attendance Problems.

1. Name all sides and angles of $\triangle FGH$.

2. What is true about $\measuredangle K$ and $\measuredangle L$? Explain why.



3. What does it mean for two segments to be congruent?

- I can use properties of congruent triangles.
- I can prove triangles congruent by using the definition of congruence.

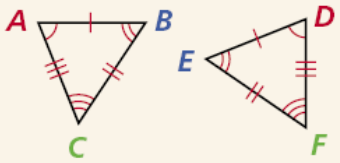
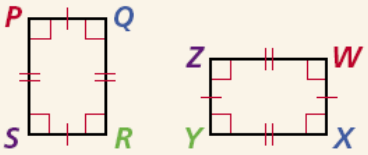
Vocabulary		
corresponding angles	corresponding sides	congruent polygons

CC.9-12.G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and prove relationships in geometric figures.

Geometric figures are congruent if they are the same size and shape. **Corresponding angles** and **corresponding sides** are in the same position in polygons with an equal number of sides.

Two polygons are **congruent polygons** if and only if their corresponding sides are congruent. Thus triangles that are the same size and shape are congruent.

Properties of Congruent Polygons

DIAGRAM	CORRESPONDING ANGLES	CORRESPONDING SIDES
 $\triangle ABC \cong \triangle DEF$	$\angle A \cong \angle D$ $\angle B \cong \angle E$ $\angle C \cong \angle F$	$\overline{AB} \cong \overline{DE}$ $\overline{BC} \cong \overline{EF}$ $\overline{AC} \cong \overline{DF}$
 polygon $PQRS \cong$ polygon $WXYZ$	$\angle P \cong \angle W$ $\angle Q \cong \angle X$ $\angle R \cong \angle Y$ $\angle S \cong \angle Z$	$\overline{PQ} \cong \overline{WX}$ $\overline{QR} \cong \overline{XY}$ $\overline{RS} \cong \overline{YZ}$ $\overline{PS} \cong \overline{WZ}$

Helpful Hint

Two vertices that are the endpoints of a side are called consecutive vertices.

For example, *P* and *Q* are consecutive vertices.

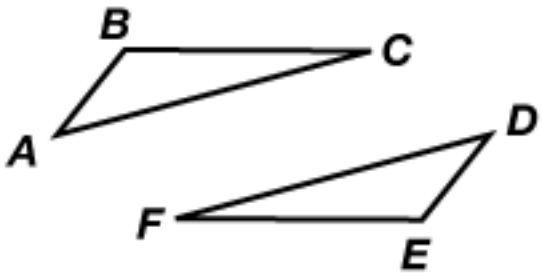
To name a polygon, write the vertices in consecutive order. For example, you can name polygon *PQRS* as *QRSP* or *SRQP*, but **not** as *PRQS*.

In a congruence statement, the order of the vertices indicates the corresponding parts.

Helpful Hint

When you write a statement such as $\angle ABC \cong \angle DEF$, you are also stating which parts are congruent.

Video Example 1. $\triangle ABC \cong \triangle DEF$
Identify all pairs of congruent corresponding parts.

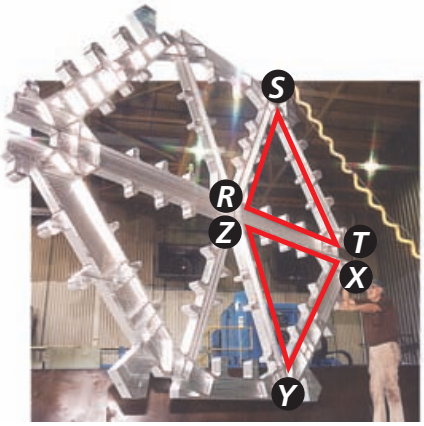


1 Naming Congruent Corresponding Parts

$\triangle RST$ and $\triangle XYZ$ represent the triangles of the space station's support structure. If $\triangle RST \cong \triangle XYZ$, identify all pairs of congruent corresponding parts.

Angles: $\angle R \cong \angle X$, $\angle S \cong \angle Y$, $\angle T \cong \angle Z$

Sides: $\overline{RS} \cong \overline{XY}$, $\overline{ST} \cong \overline{YZ}$, $\overline{RT} \cong \overline{XZ}$

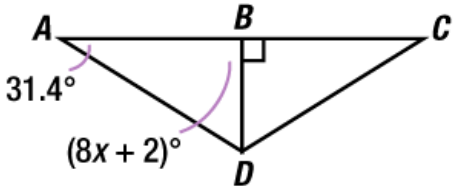


Example 1. Given: $\triangle PQR \cong \triangle STW$ Identify all pairs of congruent corresponding parts.

4. Guided Practice. If polygon *LMNP* ≅ polygon *EFGH,* identify all pairs of corresponding congruent parts**.**

Video Example 2. $\triangle ABD \cong \triangle CBD$.

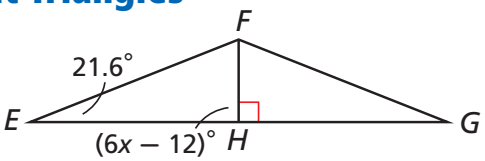
A. Find the value of x.



B. Find $m\angle BDC$.

2 Using Corresponding Parts of Congruent Triangles

Given: $\triangle EFH \cong \triangle GFH$



A **Find the value of *x*.**

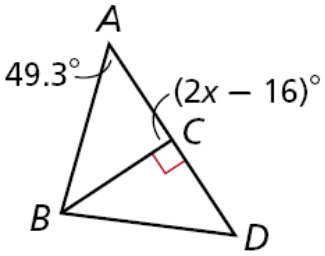
$\angle FHE$ and $\angle FHG$ are rt. $\measuredangle$.	*Def. of ⊥ lines*
$\angle FHE \cong \angle FHG$	*Rt. ∠ ≅ Thm.*
$m\angle FHE = m\angle FHG$	*Def. of ≅ ∡*
$(6x - 12)^\circ = 90^\circ$	*Substitute values for m∠FHE and m∠FHG.*
$6x = 102$	*Add 12 to both sides.*
$x = 17$	*Divide both sides by 6.*

B **Find $m\angle GFH$.**

$m\angle EFH + m\angle FHE + m\angle E = 180^\circ$	*△ Sum Thm.*
$m\angle EFH + 90 + 21.6 = 180$	*Substitute values for m∠FHE and m∠E.*
$m\angle EFH + 111.6 = 180$	*Simplify.*
$m\angle EFH = 68.4$	*Subtract 111.6 from both sides.*
$\angle GFH \cong \angle EFH$	*Corr. ∡ of ≅ △ are ≅.*
$m\angle GFH = m\angle EFH$	*Def. of ≅ ∡*
$m\angle GFH = 68.4^\circ$	*Trans. Prop. of =*

Example 2. $\triangle ABC \cong \triangle DBC$.

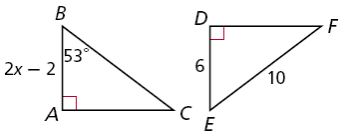
A. Find the value of x.



B. Find $m\measuredangle DBC$.

Guided Practice. $\triangle ABC \cong \triangle DEF$.

5. Find the value of x.



6. Find $m\measuredangle F$.

4-4 Congruent triangles

- *(p 243)* 13, 15, 17, 18, 24, 26a, 28.
- 4A Ready to Go On & posttests.